



Response to Consultation by the EirGrid and SONI on

the National Resource Adequacy Assessment Methodology for Ireland and Northern Ireland

Electricity Association of Ireland

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The Electricity Association of Ireland (EAI) is the representative body for the electricity industry and gas retail sector operating within the Single Electricity Market (SEM) on the Island of Ireland.

Our membership comprises utilities that represent 90% of generation and retail business activities and 100% of distribution within the market. Our members range in size from single plant operators and independent suppliers to international power utilities.

We believe that electricity has a fundamental role in providing energy services in a decarbonised, sustainable future, in particular through the progressive electrification of transport and heating. We believe that this can be achieved, in the overall interest of society, through competitive markets that foster investment and innovation.

We promote this vision through constructive engagement with key policy, regulatory, technology and academic stakeholders both at domestic and EU levels.

We represent the Irish electricity industry in EURELECTRIC, the representative body for the European electricity industry, and help shape the broader European response to developing policy and legislative initiatives.



Introduction

The Electricity Association of Ireland welcomes the chance to respond to this very important consultation on the methodology of the National Resource Adequacy Assessment. Given our understanding that this NRAA report is set to replace the Generation Capacity Statement in 2024, the need to for a thorough assessment of both the methodology and input assumptions is paramount to ensure this NRAA report is a useful and valuable document for all stakeholders and industry participants. The extension of the consultation timeline as well as the level of engagement is extremely appreciated by EAI and has helped inform the following response.

Overarching Comments

Our members' main concern with this NRAA report is understanding if/how much EirGrid/SONI will be constrained in making the necessary changes to the NRAA methodology to ensure the model is fully representative of the Single Electricity Market.

At the moment, the most recent GCS and the ERAA produce very different results despite the fact that they are both analysing adequacy. As is stated in Annex 4: Country Comments¹ of the most recent ERAA, there were differences in inputs and methodologies from the GCS that result in a different overall outcome. Part of the divergence in results is due to the timing of data freezes and members are keen to understand if the TSOs will move this data freeze to align with the ERAA? The Annex also states that the inputs into ERAA incorporates a more ambitious outlook to achieving targets from 2030 onwards. It is unclear to members what set of targets (CAP targets or EU targets) will be incorporated into this methodology. If the NRAA follows the ERAA 'ambitious' outlook on achievement of CAP target, adequacy could well be overstated. Realistic sensitivities on delivery of thermal and RES targets need to be a core element of TSO analysis given barriers to infrastructure delivery in Ireland. Clarity on these "differences in inputs and methodologies" is needed. The SEM has many unique aspects such as an isolated market, different fuel mix, and high levels of RES generation, and the modelling needs to reflect these differences.

Oversimplification of the methodology is also key concern for members as inputs such as SNSP, constraints, and emissions targets are all omitted from the modelling. The transition to a zero-carbon electricity system powered mainly by variable renewables requires appropriate consideration in adequacy assessment. The current energy system has significant reliance on fossil gas but this isn't compatible with net zero. Wind and solar electricity will supply the majority of energy needs combined with short medium- and long-term storage. With high levels of variable renewables, there will be times of low output which need to be catered for in the adequacy assessment. Prolonged periods of low wind output will impact right across northwest Europe and so its impact will not be confined to one country. In 2010 and 2011, Ireland and Northern Ireland experienced multiple prolonged periods of low wind output in relatively quick succession with these weather patterns mirrored elsewhere.

All of this means that Ireland and Northern Ireland must plan for resilience against the low renewables periods such as those seen in 2010 and 2011. This means that the starting point must be a resilient

¹ [ERAA 2023 Annex 4 Country Comments.pdf \(entsoe.eu\)](#)

dispatchable generation fleet on the island complimented by the required energy storage to meet the low renewables output periods.

The consultation plan set out in Section 2 of the consultation states that stakeholders will have further opportunity to comment on the input assumptions to be used (Spring 2024) and also on the initial results from the NRAA (Autumn 2024). It is crucial that a robust and transparent consultation process is put in place to oversee this change. As such, industry should be given an opportunity to see the results from the NRAA methodology along with the equivalent GCS results when using the same inputs so that we have a chance to refer back to the inputs/methodology. It is only after that iteration (or iterations) is complete and we are happy with the integrity that the NRAA results should be published alongside the GCS adequacy assessment in the next GCS publication.

Consultation Questions

Question 1 – Do you have any comments on the factors considered in forecasting the Total Electricity Requirement (TER)?

Many large industrial consumers have behind the meter Combined Heat & Power (CHP) and generation units and some of these have elected to decarbonise by removing their CHP and utilise grid power instead. More may follow as a quick onsite carbon reduction response and this potential increase in grid electricity demand has to be factored in.

The Adequacy Assessment process needs to review all of the factors that draw against (or are set against) the full national generation portfolio. There must be a clear demonstration that the adequacy position is considered against the full requirement of the total demand level as an input plus the generation reserves as required in the SEM. Reserves requirements in the SEM are not an insignificant level of capacity when considering the ratio of reserves to total demand and so the NRAA has to show that the detailed consideration of the generation surplus/ deficit is against this cumulative demand and reserves requirement.

Question 2 – Do you have any comments on the approach to modelling demand and flexibility?

We believe it is essential that the change in adequacy assessment methodology is complimented by a diligent testing of the input dataset with industry well ahead of the start of the actual adequacy modelling. The input data to be used should be shared with industry for review within 1-2 weeks of the data freeze date to ensure the newness of data is maintained. It is critical that working assumptions which are driving adequacy assessments are tested with industry as being representative and realistic. This approach is successfully used in the Enduring Connection Policy modelling activities such that participants are first told what data will be used in the modelling cycle; this input data is then shared with participants; and finally, the data usage in the ECP data cycle is explicitly demonstrated for participants

Demand flexibility measures as proposed in the consultation need to be realistic in their effectiveness. The risk is that should these demand reduction/ flexibility measures as modelled not materialise on

the system, then the excess demand will be difficult to manage at short notice. Therefore, EirGrid need to validate the demand flexibility as proposed in the modelling. As set out previously, this can again be done with industry externally validating the data book of assumptions to be used as quickly as possible after the data freeze date.

Question 3 – Can you identify any resources that could be considered under this methodology which are not listed above?

The resources are comprehensive for the current types of technologies. However, we think future technologies should be considered as well.

The guidance by EirGrid that the climatic variations on flows and the seasonal variability impact on regional capacity availability is captured within the methodology is to be welcomed. It is seen as essential that the modelling should test the sensitivity of regions which are simultaneously co-depending on each other for security of supply such that the modelling is explicitly cognisant when SEM is reliant on import for security. This import-reliance level at all stages across the modelled period should be reported. Marginal improvements for now are ok but where the future scale of reliance with other regions will grow, it is essential that the robustness of the process to capture co-dependencies across regions is upgraded and maintained annually for future studies. For example, the impact to supply availability in SEM by regions beyond those directly connected to SEM will need to grow in representation within the model for future years.

Question 4 – Do you agree with the proposed approach to modelling the resources listed above?

Members have serious concerns around the interconnection methodology and modelling presented in this consultation and the impact of interconnection behaviour within the model needs to be further explored. We have seen on occasion interconnectors exasperating stress events by exporting power, and this experience should be used to complement the European Resource Adequacy Assessment (ERAA) methodology for generation adequacy.

Electricity interconnection will be an important part of the zero-carbon electricity system and will move bulk volumes of renewables between markets to optimise the supply demand balance. However, interconnection will not play any significant role in security of supply when renewables output is low across northwest Europe, and this must be recognised in the adequacy assessment. Ireland has ambitious multi-GW interconnection plans but if the ex-ante contribution of interconnection in the adequacy assessment is overestimated it will lead to significant capacity shortfalls in real time. The assessment, as published for consultation does not capture these issues.

We ask that a number of updates are integrated into the model relating to:

- The use of unit specific outage rates in the model, and
- The scaling back of variable generation for outages rates

Unit specific outage rates - We ask that unit specific outage rates are used in the model. Differences can occur between the actual distribution of generation outturn availabilities and a modelled distribution. The choice of weighted averages rather than unit specific outage rates causes an

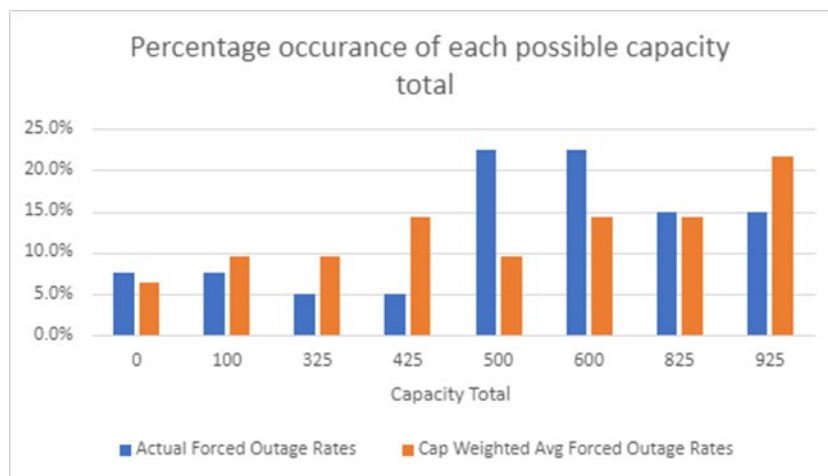
avoidable error in the modelled distributions of class availabilities. The change to this error when adding extra generation units to a weighted reliability score is generally not linear. The relationship can be quite complex due to several factors:

- **Weightings and Outage Rates (Reliability):** The impact of each unit on the overall derating depends on its individual outage rate and its size. These factors don't usually change in a linear manner as more units are added.
- **Compounding Variance:** The variance/ error in the LOLE estimate can compound in a non-linear way, especially if the units have widely varying outage rates.
- **Distribution of Outage Rates:** If generation units, when added to the modelling, have outage rates that are significantly higher or lower than the existing units, then these units can disproportionately affect the overall score. The addition of newer units with much better reliability will distort the answer by dulling the effect of the lower reliability (older) units.

Therefore, as more generation units are added to the modelling, the error or variance in the overall weighted outage rate doesn't typically change in a straightforward, linear fashion. It depends on the specific characteristics of each unit and how they are weighted in the calculation. When considering SEM in particular, the class averaging isn't actually happening over a large number of units – because of the technology definitions, with some groups having 5 or less units in them as opposed to the pan-European treatment where multiple units are grouped in the same class. We ask therefore that unit specific outage rates are used in the model.

Considering 3 theoretical units to model the difference:

	Capacity	Actual Forced Outage Rates	Cap Weighted Average Forced Outage Rates
Unit 1	500	0.75	0.6
Unit 2	100	0.5	0.6
Unit 3	325	0.4	0.6



Scaling back of variable generation - Variable generators availability should also be scaled back in modelling to incorporate outage rates.

There can be a false sense of security when modelling forced outages rates as if they have a uniform probability of occurring throughout the year. As evidenced by studies conducted by EPRI using US data², cold weather increases the likelihood of forced outages. Although Ireland isn't expected to experience extreme low temperatures very often, the dependence of the system on a limited pool of generators during cold, calm weather ("dunkelflaute") events means that this issue cannot be ignored. If the necessary data to calculate non-uniform probability of occurrences isn't readily available, a sensitivity needs to be applied where forced outage rates are increased during a specific dunkelflaute event.

Question 5 – Can you identify any additional indicators that may support communicating resource adequacy results?

We do not think we need additional indicators, as LOLE and EENS are the two most commonly used indicators, LOLE to present the probability of loss of load and EENS to communicate the expected severity of loss of load as well.

The response to Question 2 in this submission set out our view on the need for the detailed modelling database to be verified with industry. Beyond that process we believe there needs to be:

- a higher-level summary output dataset of the details on the hourly Capacity Surplus/ Deficit in a sample "stressed" week, and
- a statistical analysis/ distribution of the hourly Capacity Surplus/ Deficit for each weather year of the modelled period to highlight peak.

Question 6 – Do you agree with the approach to modelling resource adequacy implementing stochastic assessments using a techno-economic model?

It is not clear how the security of supply measures, i.e., LOLE and EENS are integrated into the modelling approach for the capacity auction. It is not clear too how the operators set the standard LOLE and EENS for the system. Furthermore, nowhere in the document, the maximum accepted levels of these measures are presented. In other words, where do the operators capture the correct standards for SEM in terms of both the methodology and level.

EirGrid have advised that measures to incorporate Out of Market measures may be captured as part of the post processing step similar to the mitigating measures chart used in the current GCS publication. We ask that the details, inputs, and outcomes of this post process step is clearly published

² [Modeling New and Existing Technologies and System Components in Resource Adequacy: EPRI Resource Adequacy Assessment Framework](https://www.epri.com/research/products/000000003002027830) (<https://www.epri.com/research/products/000000003002027830>)

within the NRAA Report to share with participants the impact these units have to the overall adequacy assessment.

The Adequacy Assessment should take into consideration the changing capacity make-up of the system as it transitions to a high RES dependency so that the system remains resilient to sudden climatic changes such as stalling weather-fronts resulting in large (GWs) changes in forecast supply.

Question 7 – Are there any considerations beyond those listed above that you would like to see considered in future adequacy assessments?

Regarding geographical scope, in our opinion, the NTC approach on balance is more beneficial, in terms of incentivising investment in transmission network on an all-island basis. In addition, the CRM auction structure already accounts for the localised constraints.

There is value in seeing all information together (i.e. methodology and inputs) and therefore, are TSO open to revisit elements of the methodology if, when the inputs are set, there are unintended consequences, or the consultation on the inputs gives a materially different understanding than was taken from the methodology consultation?